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Final Report and Evaluation of Project S.P.R.U.C.E. (Science Project Related to Upgrading Conservation Education).

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Presented is an environmental approach to elementary school science teaching. The inquiry approach is stressed and outdoor activities are integrated with classroom activities. A variety of curricular materials were developed to be used in conjunction with the New York State Elementary Science Curriculum. The project also provided workshops for teachers and supervisors, classroom demonstration lessons, identification of resources around the schools, camp programs, sanctuary programs, newsletters, a "sight and sound" program for junior high school students, and workshops for community groups. Formal evaluation focused on an intensive workshop for urban teachers given through one academic year. Comparison of classroom behavior of the teachers before and after the workshop indicated that they learned to make greater use of outdoor resources, and other observations indicated the attainment of other objectives of the program. Workshops, including some for preservice teachers, and other project activities are described and evaluated in less detail. The phasing out of the project is discussed and recommendations are made for similar projects in terms of staffing, program scope, selection of teachers for workshops, and evaluation. This work was prepared under an ESEA Title III contract. (EB)

FINAL REPORT AND EVALUATION OF

PROJECT S.P.R.U.C.E.

(Science Project Related to Upgrading Conservation Education)

1966-67 Known as Project P.I.N.E.
1967-68 Project S.P.R.U.C.E.
1968-69 Project S.P.R.U.C.E.

Project Director: Dr. Phyllis S. Busch

Project Evaluator: Dr. Irmgard F. Karle

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June 30, 1969

A special debt of gratitude is offered to Dr. Esin Kaya, Chairman, Department of Educational Psychology, Hofstra University, whose guidance and encouragement gave direction to the report and to the evaluation. Appreciation is also extended to Mrs. Claire May, Research Assistant, who so ably fulfilled her assignments.

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PROJECT S.P.R.U.C.E.

I INTRODUCTION

A. PURPOSE: Project S.P.R.U.C.E. (Science Project Related to Upgrading Conservation Education) developed and disseminated instructional and concrete materials designed for the teaching of science-conservation, indoors and outdoors, relating such instruction to existing courses of study (science, social studies, health, economics), focusing on the ecological approach and emphasizing methods of inquiry.

B. HOW THE AIMS OF PROJECT S.P.R.U.C.E. DIFFERED FROM OTHER SIMILAR PROJECTS: For the past several years, ever since the advent of Sputnik in 1957, there has been a wave of educational unrest in the science programs in the elementary schools. Either nature study or nothing was the rule. Science programs of various kinds began to find their way into elementary schools, these were primarily modified or watered-down high school science courses of study.

More recently an increased awareness of the inescapable hazards on human survival resulting from our highly advanced technology has been felt; this has placed another emphasis on science teaching in our schools. Conservation education was recognized to be an imperative part of general education. In haste and in anquish, ecology was introduced into some existing school programs. Outdoor education began to declare itself as an essential program. Camping for a week in the last year of elementary school is spreading as "the conservation experience". Currently, environmental education, is superseding many of these attempts.

Some schools are still struggling with Phase I - the introduction of the science program in the elementary school.

Many new science programs will be developed - all with kits, books, and high-pressure salesmen, leaving the total science-conservation effort in a state of confusion. Unfortunately for the most part, all that is happening is name changing and there is little or nothing ongoing in many schools.

C. HOW THE PROGRAM OF PROJECT S.P.R.U.C.E. DIFFERED FROM OTHER SIMILAR PROGRAMS: Project S.P.R.U.C.E. has been realistic and innovative in its emphasis as well as techniques. In order to incorporate the environment into our program, we started with the teachers where they were. For the sake of unity the program has been based on "Science For Children K-3; 4-6" which is the New York State Elementary Science Curriculum. This is what the teachers are teaching. From this starting point the project developed an approach to elementary science teaching which is ecological: i.e., it stresses interrelationships, which cut across science disciplines (biology, physics, chemistry, earth science) as well as across subject matter areas (social studies, geography, economics, etc.). If there is an ecological emphasis in this, conservation outcomes can easily be developed. It is then up to the teacher to involve pupils to the point where a sense of responsibility is translated into concrete actions and such behavioral outcomes are possible at each grade level. The child is thus motivated to learn, to feel responsibility, and then to act.

Since science includes learning about the objectives and events in the universe, it is easily recognized that the universe is greater than the classroom, the text, a film. Investigating problems in areas immediately outside the classroom door, converting the use of school sites into laboratories for learning, was another important part of the S.P.R.U.C.E. effort.

In contrast, the use of more distant areas for valuable though occasional field trips was also developed.

Thus, the program of Project S.P.R.U.C.E. focused on science as an appropriate vehicle for conservation education, drew upon all other disciplines as it tried to develop attitudes and values which would help to train future citizens to recognize environmental problems and to participate in their solution or prevention. It developed numerous techniques for learning in the environment and about the environment. It helped teachers to plan experiences for children which involved them in problem solving and discovery.

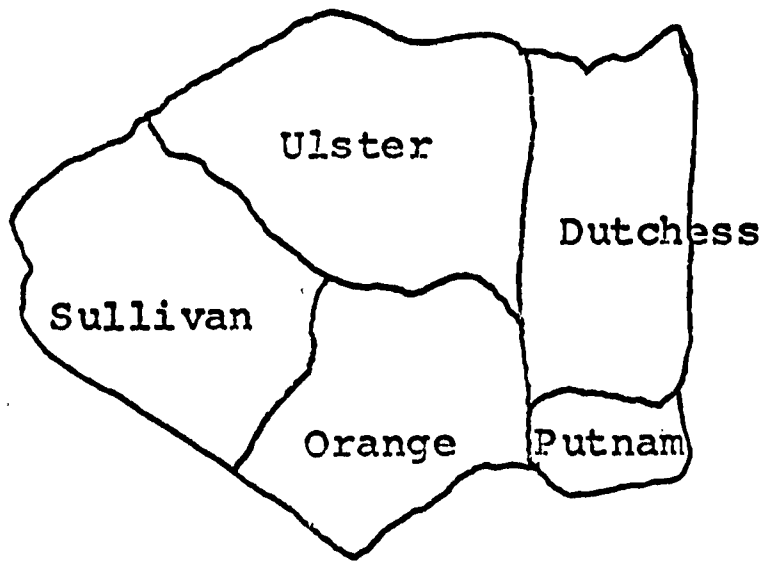
D. GRADE LEVEL: The small size of the permanent staff and the unavailability of trained personnel for this specialized program made it necessary to confine the teaching chiefly to elementary schools. Some work on the Junior High level was carried on in two schools and one unit on water and water pollution was tested in the secondary schools.

E. CURRICULA MATERIALS: As an outgrowth of the many innovative approaches to introduce the program to the large number of teachers and pupils in the five counties, a large number of curricula materials were developed and disseminated.

F. OUTDOOR LABORATORIES: Since the program stressed frequent incorporation of outdoor experiences on school sites as an essential ongoing part of everyday teaching, techniques for developing the use of such areas and of working with children in outdoor environments were emphasized.

The aim of the program of Project S.P.R.U.C.E. was truly environmental education. Emphasis was placed on content and method.

G. GEOGRAPHY: The accompanying map indicates the five counties of the Mid-Hudson Catskill Region which Project S.P.R.U.C.E. served.



H. PROGRAM

1. Teacher Workshops: A course of laboratory workshops was held for teachers and supervisors. Emphasis was on content, techniques, and suggestions for teaching science by inquiry both indoors and outdoors with the aim to develop an ecological understanding and to awaken a conservation conscience.

2. Classroom Demonstration Lessons: Classroom demonstration lessons were given in many schools as well as in the schools of workshop participants. Three-parted lessons were taught: "indoors,-outdoors,-indoors".

3. Curriculum Materials: A variety of curriculum materials was developed: self-discovery guides, plans for teaching science-conservation indoors and outdoors at all grade levels, specific urban aids, etc.

4. Development of the use of school sites as laboratories for learning: School sites were surveyed and teaching resources for outdoor investigations were identified.

5. Sanctuaries - their development and use: An ongoing program for school children and adults has been developed at the Jay Skidmore Sanctuary in the Town of LaGrange, Dutchess County.

6. Camp Programs: The staff of Project S.P.R.U.C.E. developed a two week camping program for the Duzine School of New

Paltz in 1968. This two week program had its instructional program designed by the staff and the New Paltz Campus facilities at the Ashokan Reservoir were used. As a result of this program and its evaluation, "A New Approach to School Camping for Grades K-6" was written up this year.

7. S.P.R.U.C.E. Urban Discovery Box: This S.P.R.U.C.E. Discovery Box, designed for grades K-6, consists of specimen and an accompanying manual. It is a first-hand guide to carrying on science investigations indoors and outdoors in urban areas.

8. S.P.R.U.C.E. Discovery Corner: This 17" x 12" attractive, folding cardboard shelf is designed to stimulate inquiry in science-conservation. Numerous materials were produced for utilization in this matter.

9. Sight and Sound Program for Junior High School: The emphasis on the junior high level was environmental awareness--what is good? What is bad? What can we do? To answer these questions, tape recorders, records, and films were used in a unique way combining science-conservation, art, music, poetry.

10. Newsletters covering topics of the "New" Conservation: Each issue of S.P.R.U.C.E. NEEDLES was devoted to a newly recognized conservation concern. Background information, reading references and teaching tips are included.

11. Community Programs: Workshops were held for community groups as well as for community group leaders.

II EVALUATION OF THE PROGRAM OF PROJECT S.P.R.U.C.E.

A. INTRODUCTION

The purpose of any evaluation is to assess the effectiveness of the many facets of the program being considered. Although we are presenting in the following pages an evaluation of the many phases of Project S.P.R.U.C.E., we should not neglect to remember that evaluation has been a continuous rather than just a terminal part of the entire project.

Project S.P.R.U.C.E. has been a very ambitious program; great emphasis has been placed on teacher workshops and preparation of resource materials. In addition, many different but closely related areas have also been developed. Since these many areas are often quite different, each one will be treated individually.

The approaches to the different phases are varied. Those phases which could be treated statistically were handled in this manner. In other areas, the most appropriate approach was utilized.

Since the urban teacher workshops represented an area of special focus, they have been most carefully examined.

II B. TEACHER WORKSHOPS

1. GENERAL BACKGROUND

During the third year of Project S.P.R.U.C.E., an intensive in-service urban-oriented workshop in Science-Conservation for teachers and supervisors of elementary grades was taught by Dr. Phyllis S. Busch, director of the project. The workshop consisted of fifteen, two-hour sessions and spanned over the entire school year. The program attempted to develop the ability to utilize the resources outside of the classroom for problem-solving, to utilize the principles of conservation as an essential part of teaching science as well as other disciplines, to enrich science teaching by concentrating on the use of outdoor resources, both on the school site and in more distant areas such as at sanctuaries, parks, camps, etc., to up-date content and methods of teaching science - conservation, and to become familiar with the techniques and the resources for achieving these objectives.

Fifteen elementary school teachers were enrolled in the workshop; in addition seven individuals, not currently teaching also participated. Of these seven, four were from the U.S. Park Service, Department of Interior, stationed at Hyde Park, N.Y. They were part of a pilot program for teaching environmental education using the Roosevelt Historic Site. Their purpose was to gain the knowledge and techniques available at the Project S.P.R.U.C.E. workshops. For this evaluation we will concentrate primarily on the classroom teachers who are in a position to put their specialized workshop training into practice.

The participating elementary school teachers came into the program with very different backgrounds. Thirteen of the fifteen undergraduate degrees were not in an area of science. The number of science courses taken by these thirteen teachers ranged from zero to six; the median was three. Six of the fifteen teachers had earned masters degrees; only one of these was in science. The number of years of teaching experience ranged from three to twenty-four years; the median was seven years.

The grades represented were Kindergarten through eight. The thirteen teachers indicated above taught science from sixty to two-hundred-forty minutes per week; the median time was one-hundred-twenty minutes. The two teachers with undergraduate and graduate science degrees were teaching science in the junior high grades where specific and longer periods of time were devoted to science.

The elementary school teacher must by the very nature of the assignment be a specialist in seven or eight areas of knowledge. Yet, the preparation in science is as a general rule, not an area which receives great concentration and stress.

II B.2. APPROACH TO EVALUATING THE YEAR-LONG URBAN WORKSHOP

All of the teachers were observed in their classrooms at the beginning of the workshop in the fall of 1968. A running account of each lesson was made by Mrs. Claire May, an experienced research assistant, and the account was analyzed in terms of the amount of time spent in utilizing the following cognitive functions. These functions are inherent in the processes of science which were emphasized in the methodology.

classify objects, events, etc.
compare objects, attributes, etc.
hypothesize relations
construct or reconstruct things
generalize principles from observed particulars
describe what is observed
make value-judgements
synthesize objects, events, etc. by relating them to one another
derive new things and relations
explore
plan and organize data, events, etc.

In addition, the lessons were analyzed to determine the extent to which they incorporated the other objectives of the workshop which were previously enumerated.

The reliability of the observer was established in the following manner. Both Mrs. May and the evaluator observed the same lesson and independently kept a running account and analyzed it, in terms of the amount of time spent in the specifically identified cognitive functions. The very high degree of agreement in both analyses established the reliability of the observer.

Near the end of the workshop, all teachers were again observed in their classrooms and the running accounts of their lessons were analyzed in the same manner as in the fall.

The initial observation was needed in order to establish what processes the teachers were originally using; the final observation should indicate what changes, if any, have taken place.

II B.3. ANALYSIS OF THE OBSERVATIONS

One of the objectives of the workshop was to train teachers to make use of the resources on school sites. Therefore, the initial and final observations of the sample of fifteen teachers were analyzed in order to find out whether this objective was achieved.

The Chi square test was used to analyse the data, since the observations could be classified into discrete categories and treated as frequencies. The null hypothesis was tested. This involved testing whether the observed frequencies were different from the expected frequencies.

Analysis yielded the following data:

	Initial Lesson	Final Lesson
Indoors-Outdoors	2	10

The initial number of "indoor-outdoor" approaches served as the expected number of frequencies and the final number of "indoor-outdoor" approaches served as the observed number of frequencies.

Using the formula for Chi Square

$$X^2 = \sum \frac{(n_i - n_i')^2}{n_i'}$$

where X^2 = Chi Square

n_i = the observed number of observations in the ith category

n_i' = the expected number of observation in the ith category*

We have the following: $X = \frac{(8)^2}{2} = 32.$

Since there were 15 cases, the degrees of freedom that we have are 14. Using the X^2 table, with the degrees of freedom indicated, we find that our value is greater than the table values at the 0.01 level of significance. We, therefore, reject the null hypothesis and conclude that the year-long urban workshop was most effective in achieving the objective of utilizing the resources in teaching science-conservation on school sites.

It should also be noted at this time, that most of the five final lessons observed which did not make use of the out-of-doors were in topic areas which were better taught indoors, such as in the area of electricity, and human physiology.

Although the use of outdoor resources for teaching science-conservation was the only objective which indicated a significant difference when the pre and post observations were carefully analyzed, there were indications that teachers were putting into practice the new concepts and techniques which they had recently acquired.

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* Edwards, Allen. Statistical Methods for the Behavioral Sciences, page 367.

The initial observation occurred as a rule after the fourth workshop session. At the very first session, the teachers were introduced to the main aims of the workshop: the product (science conservation), the process (methods of inquiry), and the production ("indoors-outdoors"). This was referred to throughout the course as the three "P's". It was during this initial session, in assessing the needs of the teachers, that they expressed the greatest lack of confidence in the art of questioning directed towards problem solving. Therefore, great emphasis was placed on questioning techniques. Each session culminated with the distribution of a set of questions prepared by Dr. Busch on the workshop lesson. These were used as a guide for the ensuing week for planning problem-solving lessons and for learning how to ask questions of the children. The teachers grasped the questioning techniques very readily.

In the initial observation, (which occurred after the fourth workshop session), all teachers employed questioning techniques in their lessons and these same techniques were also observed in the final observations. The use of these methods and the observed decrease of "reading from" the textbook indicated that problem-solving was occurring.

According to the questionnaires completed by workshop participants, their preparation in science was very limited. Consequently, the teachers were seeking to acquire considerable basic knowledge at the workshop. This fact is attested to by the following teacher comments:

> "Dr. Busch covered science areas I never dreamed could be a lesson!"
>
> "I think many in the class were as unenlightened as I and came to learn as much as possible. We all came away very much enriched".
>
> "I learned a great deal which in turn I could take back to the classroom and do with the children".

The teacher workshops utilized the principles of conservation as an essential part of teaching science. Although the analysis of pre and post lessons did not reflect a significant difference in the realization of this objective, we should not lose sight of the fact that individual teachers did utilize conservation principles in their science teaching.

Perhaps it is really not too surprising that conservation concepts acceptable to the evaluator were not frequently recorded in the observed lessons. The level of acceptance by the evaluator of what constitutes a conservation concept differs from that of what is generally accepted in other programs. The mere recognition of a flower or description of an insect was not considered to be a conservation concept; the action of doing something about the destruction of the plant or the spraying of the plant - these would be accepted as conservation concepts. It is interesting to note that many of the current publications are still only dealing with conservation on the nature study level and do not go beyond this step to develop conservation concepts. Much which is purported to be conservation education is not. A recent publication by Stapp[1] more nearly reflects the current philosophy of conservation concepts which is acceptable to both Project S.P.R.U.C.E. and to the evaluator.

Teachers were utilizing conservation concepts in their classwork. We must not forget how handicapped the teachers were by their lack of scientific knowledge. This made it even more difficult to include conservation concepts within a science framework.

At the workshops the teachers were observed to verbalize an interrelationship between conservation and science, as well as between conservation and social studies. However, back in their classrooms, the observed lessons reflected limited incorporation of such an

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1 Stapp, William "Environmental Education". University of Michigan, School of Natural Resources. 1969.

approach. Possibly the fuller translation of these concepts will be achieved after the teachers have gained greater confidence in their science competence. In addition, only two lessons of each teacher were observed; often these were very different lessons which necessitated different approaches.

The urban teacher workshops did achieve its objectives in ways that we could not fully account for statistically in the observed lessons. The teachers have most definitely become aware of their "total-environment" and have demonstrated the use of "indoor-outdoor" for teaching science-conservation. They have developed a wealth of science concepts, have been introduced to resource materials and experiments, and there are indications that changes are taking place in their classroom teaching using methods of inquiry as explained in the previous sections.

II B.4. OTHER WORKSHOPS

In addition to the fifteen session workshop discussed earlier, a number of other types of workshops were given by Dr. Busch during 1968-69. Early in the fall of 1968, requests were received by Project S.P.R.U.C.E. from Bennett College, in Millbrook, New York, and from Vassar College in Poughkeepsie, N.Y., to give some workshops in science-conservation to selected student teachers. Project S.P.R.U.C.E. was not originally designed to include working with college students. However, these briefer workshops were deemed a valuable pre-service experience which could further assist in evaluating our teacher workshops.

Bennett is a junior college and most of the students indicated they were preparing to teach in nursery schools and grades 1 and 2. Five workshops were given.

Vassar students were preparing to become elementary school teachers and they participated in a series of six workshops. During both series, the college instructors were present during each workshop.

Bennett and Vassar were aware of special needs in the area of science-conservation education and were desirous of upgrading their work in these areas. Vassar was especially interested in an urban emphasis. It is salutary that both institutions recognize areas that need strengthening and are making use of federal projects for this purpose.

As a culminating experience, the Bennett girls were asked to prepare a plan for a science lesson. Careful analysis of these

plans indicate that these students were attempting to utilize the outdoor classroom, were using the problem-solving approach in the teaching of science, and were making conscious efforts to encourage the involvement of children in the learning process.

Mrs. May, our research assistant, observed Dr. Busch at one of the Bennett workshops and a running account of the lesson can be found in the appendix on page 46. The college teacher was interviewed by Mrs. May and the details of her enthusiasm and effectiveness of Dr. Busch and the program may be seen from the report in the appendix on page 49, and her letter on page 50. Further indications of the value of these workshops can be found in the many laudatory remarks made by the students.

The Vassar group was engaged in practice teaching in the urban schools in Poughkeepsie, New York. They were, therefore, able to incorporate in their teaching the new learnings from the science conservation workshops.

Dr. Josephone S. Palmer, Director of Elementary Teacher Education, at Vassar College indicated the following in her letter of December 9, 1968:

> "It has been a very rewarding experience for the Vassar students to have four sessions with you during the period when they are doing their student teaching.
>
> I wish you could have seen, as I did, how they put into practice immediately the ideas and suggestions that came from each of your presentations. Wednesday of this past week, following your visit on Tuesday, I saw two of the girls making use of the materials you had distributed to them in the "Discovery Boxes". You have created a real interest in conservation education with these prospective teachers, and I am sure they will carry this into their classrooms."

In her letter of January 20, 1969, she writes:

"Here is a copy of the booklet prepared by Betsy Young for a 3rd grade class at Columbus.

I observed the day she used this with the entire class (each child had a copy). This served as a reading experience and a summation of the work she had done over a period of weeks in Science.

The enthusiasm of the class was great to see. It was such a thrill for each child to see his name in print and to read the section dealing with his own particular experience.

Betsy has tried very hard in all of her teaching to use the many ideas and suggestions that came from her work with you.

My thanks again for your contribution to teacher education."

Miss Sharon Kerman, a student in the Vassar Workshop, wrote:

Dec. 19, 1968

"I can't thank you enough for your help in how to go about teaching science. As a history major with a strong orientation toward the humanities, science had been the fear of my life -- in the classroom. I have used your discovery box and found it so helpful, that I took an extra box. Knowing that I have access to materials and to expert advice is a great form of security for me and has made me more confident in my teaching, as well as better prepared. Thank you."

The summary of Mrs. May's interview may be found on page 52 of the appendix.

The letters of the Director of Elementary Education and of the student are indices of the effectiveness of the workshops. Many of these young teachers will continue to use the inquiry approach "indoor-outdoor" conservation in their science teaching. The Vassar and Bennett experiences emphasize the importance of pre-service training as an effective way of introducing into our schools the use of outdoor resources in teaching science-conservation by methods of inquiry. Training is more successful than re-training.

A series of four teacher workshops was given to elementary school teachers in Orange County. Dr. Busch taught two of the sessions;

a staff member taught the last two sessions. Although this series was of shorter duration, the approach was not varied appreciably. At the end of the workshops teachers were asked to indicate those aspects of the program that should be retained and what specific suggestions they would make for modifying the program.

The teachers indicated that the following aspects should be retained:

"The materials produced by Project S.P.R.U.C.E. should be made available throughout the U.S.A. since they are invaluable aids in any teaching situation".

"The techniques used in teaching the class were very good. They demonstrated what we should do as teachers".

"The program helped to develop sensitivity to our environment".

"It was good to have teachers involved in outside surroundings".

"I wish there had been more workshops".

"I especially enjoyed the aspect of involvement. Instead of sitting and listening, you are actively involved!"

"It was one of the most worthwhile courses I have ever taken".

"I wish this type of workshop could be continued".

They suggested the following modifications:

"There should be more time provided for <u>obtaining information</u> about flowers, trees, etc." (It is hard to drive out the teachers indoctrination of pure nature study)"

"It would be a big help if our school area could be surveyed for teaching stations".

"The program should be designed to meet more frequently and for shorter periods of time".

One can clearly see from these teacher comments that the science-conservation workshops were a significant and most unique experience for these elementary schoolteachers. These would not have been

possible, were it not for the work of Project S.P.R.U.C.E.

Dr. Busch was asked by the National Park Service, U.S. Department of the Interior, Roosevelt-Vanderbilt, National Historic Sites in Hyde Park to teach several workshops for them which they were giving to teacher and adult groups in Hyde Park. She concentrated chiefly on the "techniques" which could be used to carry on investigations in outdoor areas.

In addition to the workshops cited, Dr. Busch gave numerous single workshops during the year. Mr. Sheldon A. Levine, Director of the Westchester County Conservation Education In-Service Program, wrote in his letter of January 7, 1969:

> "On behalf of Federated Conservationists of Westchester County, BOCES I and II, and the participants of the Conservation workshop, I would like to extend my sincerest appreciation and thanks for your most informative and stimulating presentation entitled: "Air: A Vital Resource".
>
> Your presentation obviously had a significant impact on all those attending. I am certain that there will be much carryover in the classroom.
>
> Sincere thanks again for sharing your knowledge and talent with all of us. And do come visit us again at your leisure."

Whenever possible Dr. Busch conducted workshops with administrative personnel in order to break down "points of resistance" to new program ideas. Examples of such efforts are: an early workshop in September, 1968, for Dutchess County science coordinators, an urban workshop in Ulster County and a presentation at a principal's meeting in the Wappingers School District, both in May 1969.

The many workshops offered by Project S.P.R.U.C.E. were an outstanding experience for teachers and administrators; they have truly made a major contribution to science-conservation education.

II C. CURRICULUM MATERIALS

The scope and impact of Project S.P.R.U.C.E. in 1968-69 had broad breadth and depth. One is almost unable to comprehend that in addition to the many facets of Project S.P.R.U.C.E., the following curriculum materials were developed by Dr. Phyllis S. Busch:

"A New Approach to School Camping Grades K-6: Some Suggestions for Outdoor Investigations in Science-Conservation for Camps, Playgrounds, Parks, Sanctuaries"

"Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation"

"Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation" (Urban)

"S.P.R.U.C.E. Discovery Manual 169 Investigations Indoors & Outdoors, Grades K-6"

"S.P.R.U.C.E. Urban Discovery Manual: 75 Stimulating Ideas for Investigating Some Common Urban Resources K-6"

"Some Guides to Discovery About Cement, Cockroaches, Earthworms, Elm Trees, Owls"

"Some Problems for the Teacher Useful as a Basis for Planning Lessons in Science-Conservation"

"Teaching Tips on Current Environmental Problems"

Requests for copies of these materials have come to the project from all over the United States and Canada. A deluge of requests came from the State of Michigan following a brief announcement of Seven Steps in "Environmental Education News for School People" published by the Information and Education Division of the Michigan Department of Natural Resources.

Many requests came from elementary school principals; however, it is interesting to note that many letters came from elementary teachers, naturalists and foresters, conservation and outdoor education specialists, State Departments of Agriculture, soil conservation

services, county agricultural agents, the National Audubon Society, state departments of forests and parks and the Conservation Foundation. From this impressive list one can see that the curriculum materials have reached many levels of education, many societies, foundations, and governmental departments. The U.S. Office of Education has requested a complete file of Project S.P.R.U.C.E. materials for their files. In addition to these materials, manuals, certain bibliographies, numerous discovery guides and data sheets, sanctuary aids, selected visuals and many techniques for teaching have been prepared. A complete listing of the materials produced by Project S.P.R.U.C.E. may be found in the Appendix on page 53.

The exceptional quality of all of these resource materials is evident from the frequency of requests as well as the following actions. ERIC, the nation-wide Information Analysis Center for Science Education has listed the publications of Project S.P.R.U.C.E. and they are receiving requests for these materials. The American Nature Study Society felt that "Seven Steps" was so valuable that it reproduced this publication!

Dr. Matthew Brennan, Director of the well-known Pinchot Institute for Conservation Studies has indicated his concern for obtaining wider distribution of materials. In a recent letter he wrote:

> "Thank you so much for your newest contribution to conservation and education, "A New Approach to School Camping, Grades K-6". It represents a most useful addition to the materials you have produced, and also represents the caliber of materials that we have come to expect from Project S.P.R.U.C.E.
>
> It is distressing to know that some of the really worthwhile Title III projects, such as yours, will no longer be federally funded. I am especially concerned with the termination of not only production, but distribution, of the fine materials which have been created.

Is there any way that The Pinchot Institute could assist in getting a wider distribution of your materials?"

They have requested that they be sent a carton of materials which they could use for dissemination.

The written materials produced are all of outstanding calibre and many school systems will be using them in many phases of their curricula at the present time and in the future.

II D. SANCTUARY PROGRAMS

Through the special efforts of Project S.P.R.U.C.E. fifty acres of land were secured for use as a sanctuary. This was a gift of Miss Hazel Skidmore and has been donated to the Dutchess County B.O.C.E.S.

Project S.P.R.U.C.E. initiated the science and conservation education program at the sanctuary and has endeavored to assist in the utilization of this natural area.

During the Fall of 1968, fourteen school groups visited the sanctuary; in the spring of 1969, twenty-four school groups visited. Teacher-naturalists from Project S.P.R.U.C.E. worked with these groups and their teachers. Data of groups attending can be found on page 56.

Three family field trips with a leader from Project S.P.R.U.C.E. were held during the year. Approximately 50 people attended each of the walks.

Since sanctuary trips are really for enrichment purposes, they require a different approach. Because of this, Dr. Busch held one entire teacher workshop (for the teachers enrolled in the intensive in-service workshop) at the sanctuary. This experience was to prepare teachers so that they could use a sanctuary experience to the best advantage.

There is a very strong indication that there will be continued use of Skidmore Sanctuary to provide children with unique experiences. A questionnaire sent to elementary and middle school principals, supervising principals, science coordinators and some curriculum coordinators indicates that 65 percent of the respondents are definitely planning to use Skidmore Sanctuary. 10.5% have not completed their

plans with reference to using the sanctuary and 24.5% are presently not including plans to use the sanctuary. The Wappingers School District requested a meeting to explore the possibility of developing their own present and future school sites for "indoor-outdoor" science-conservation teaching. Some respondents indicated that there were transportation problems; others had not yet completed their planning.

The sanctuary, in addition to the expanded use it has experienced during 1968-69, has also had some structural work completed. Mr. Morris working with eight boys from the Dutchess County Office of Economic Opportunity Junior Conservation Corps constructed some sanitary facilities at the Sanctuary. The remaining structural projects will be completed by the students in various vocational class of Dutchess County B.O.C.E.S. under the supervision of their teachers.

An advisory committee for Skidmore Sanctuary was established. Dr. Busch, Director of Project S.P.R.U.C.E., has already met twice with the committee and plans are well-developed to continue to use the sanctuary for the purpose of environmental education. Mr. Higgins, Assistant Superintendent of Dutchess County B.O.C.E.S., indicated that B.O.C.E.S. will be meeting with the advisory committee; plans for next year are already being discussed!

In Orange County, the Garden Club purchased a twelve acre site for sanctuary experiences. Although this area has been maintained for the last eight years, its use was definitely minimal. Prior to the last two years when the direction and influence of Project S.P.R.U.C.E. became so significant, only two or three classes each spring and fall utilized this resource area. The work of Project S.P.R.U.C.E. in that county has brought about a tremendous increase in site

utilization; whereas previously only 4-6 classes per year visited, now many teachers with their recently acquired workshop experiences, are leading their own groups. Last summer, the Garden Club provided funds to run a five week summer school at the sanctuary. The workshops have made a significant contribution in preparing teachers for this enrichment of classroom learning.

II E. URBAN DISCOVERY BOXES

One of the most innovative efforts of Project S.P.R.U.C.E. was the development of three discovery boxes. One was prepared each year and contained many different materials. During the first two years the boxes featured investigations of a more rural nature. During the last year the focus was on urban investigations.

There is a tremendous urgency to make city children aware of their immediate environment - both indoor and outdoor. The Urban Discovery Box was developed by Dr. Busch and distributed to thirty regional principals. Fifty sample items were included in this resource unit. A very helpful and complete manual has been prepared giving the teacher background material needed in assisting children to carry out investigations. Additional investigations and discussion questions are suggested.

These boxes have just recently been distributed; to date, no teacher evaluations have been received. However, already many requests for additional manuals and discovery guides have been received by the office. Two representative letters commending this work may be found in the appendix on pages 59 and 60.

II F. JUNIOR HIGH PROGRAM - "SIGHT AND SOUND"

A program was developed for junior high school students which sought environmental awareness. The approach was not via science courses alone, an inter-disciplinary approach using the social sciences, English, music, art, and visual techniques was employed.

Eight seventh grade classes and one eighth grade class in two school districts (Pine Plains and Millbrook) participated in this program. A Project S.P.R.U.C.E. Teacher-Naturalist worked directly with the students. In both schools, the teachers of these participating classes observed the lessons since they would assist in carrying on with some of the work and hopefully they were preparing themselves to utilize some of these approaches in their future teaching.

The first lesson concentrated on exploring "How Pictures Tell a Story - An Expression of Ideas and Feelings". Cameras were available for student use; each class was asked to prepare a brief series of slides which depicted the life of a seventh grader at his school. Songs and verses, to accompany the slides, were encouraged.

The third lesson reviewed the influence of man upon the land and examined the growth of a community. At the next meeting, students were encouraged to plan a new community and examined the good and bad features in their immediate community.

Although the program did bring about some environmental awareness in the participating students and teachers, it did not achieve all of the expected results. This was a new approach for students and teachers; flexibility, creativity, open-mindedness, all were required. An innovative approach often runs into a number of problems. Probably the greatest difficulty in this instance arose from the fact that an interdisciplinary approach demands that a teacher have a broad and

sound background in the subject matter area as well as successful teaching experience.

The goals of this program are very valid and hopefully, others will attempt to use this meaningful approach to science-conservation teaching.

II G. NEWSLETTERS

During 1968-69 Project S.P.R.U.C.E. continued the production of its newsletters emphasizing aspects of the "new" conservation.

1. Water
2. Noise
3. Population and Space
4. Snow
5. Field Trips

All of the newsletters, except the one on field trips, included appropriate background information, teaching tips, and reference materials.

The latest newsletter, appearing in the form of a small, convenient brochure, discussed the field trip as an enrichment experience and gives a comprehensive list of sanctuary areas in the five county area which Project S.P.R.U.C.E. served. This source will no doubt reveal to many people nearby sanctuaries that they were unaware of.

On the average, 1000-1200 copies of each issue were mailed out. Teachers have commented most favorably about these and many have indicated that they have put into practice many of the suggestions indicated in these sources.

The New York State Outdoor Education Association has found these newsletters to be so remarkable that they have requested 200 copies of each for distribution to their membership!

The many teaching tips included in these newsletters and materials used in the Discovery Corners have just been reorganized into a small brochure entitled "Teaching Tips on Current Environmental Problems" which has already been widely distributed, this will continue to receive extensive use.

II H. DEMONSTRATION LESSONS

Demonstration lessons were given in the regular classroom setting by the Project S.P.R.U.C.E. staff. These were held not only in the schools of workshop participants but in several complete schools. The principals were invited to free other teachers so that they, too, might observe the demonstrations. Three-parted lessons were taught "indoors", "outdoors", and "indoors".

Seventy-three "indoor-outdoor" demonstrations were given to 3,481 children using this unique approach to teaching science-conservation which made use of the immediate schoolgrounds.

There is no question that these special lessons have been most beneficial and this approach has reached many teachers who could not participate in the teacher workshops.

II I. COMMUNITY GROUP PROGRAMS

With limited time and staff, community action could not be given high priority. However, whenever called upon every effort was made to render assistance.

The staff has worked with groups of camp counselors and assisted them in developing appropriate science investigations for campers. Outdoor investigations have been demonstrated to scouts and their leaders at Wilcox State Park and Sprout Lake.

The project staff has worked with a number of garden clubs and has given assistance with several science exhibits in the public library.

Each month, a varied and stimulating display has graced the office windows of Project S.P.R.U.C.E. Examples of the scope of these displays are indicated by some selected subjects.

Activities for Campers and Children
Poisonous Wild Plants
The Need for Zoning
Snowflakes

The public has reacted most favorably to these and many individuals came into the office to ask questions.

Many requests to meet and speak to community groups were filled. Examples of such groups included church groups and the Forest Practice Board - a regional volunteer group working with the New York State Conservation Department.

The National Audubon Society in Sharon, Connecticut, has requested the services of Project S.P.R.U.C.E. Dr. Busch has led walks, worked with parent groups and taught teacher workshops.

Local girl scouts offered their services to the project and they assisted in clerical work as well as in the collection and assembling of parts of the urban discovery box.

II J. STAFFING DIFFICULTIES

We would be remiss if no mention were made of some of the staffing problems that Project S.P.R.U.C.E. experienced. Major difficulties were encountered in recruiting well-prepared staff for such an innovative project since the criteria for such personnel required the following qualifications: teaching experience, a sound science background, and knowledge of the outdoors.

In itself the criteria for staff-selection limited the number of possible applicants. However, perhaps an even greater problem arose from the late date of funding of the programs. The government provided funds after each school year had already begun and teachers were already employed. Many potential teachers for the program were already placed in positions since it was actually October or November before the director could ethically ask staff to commit themselves for the year!

Since projects such as S.P.R.U.C.E. receive funding on a yearly basis only, problems arise from this action. Federal agencies should realize that such action does not aid in the recruiting of older, more stable staff since the lack of job security is so distinctly present. Consequently, yearly funding tends to attract the very young applicant who is mobile, with few ties, and who in addition does not present the necessary experience and in general the best qualifications one would desire. In the three year period, Project S.P.R.U.C.E. had only one experienced teacher for only one year. Staff rotation was enormous. A total of thirty-nine people participated in the project over the three years whereas the budget provides for only four full time staff members! Funding should not be limited to a yearly basis when a project has proven its contribution!

A more appropriate period would be from five to eight years - a period of time in which a project REALLY can make an impact and "carry-over" of the project would be well established.

In view of these major staffing problems, the Director of the Project, Dr. Phyllis S. Busch, assumed many additional responsibilities which one would not normally include in the job description. Her vast contribution has, in spite of the many problems, made Project S.P.R.U.C.E. well-known and well-received, in New York State and throughout the nation. In addition to the many facets of administering the project, Dr. Busch has had to train her staff, has written almost all of the published resource materials, has taught almost all the workshops and has been directly involved in all facets of the project. The accomplishments of Project S.P.R.U.C.E. are truly remarkable and could not have been realized without the unique, unexcelled contribution of the director.

II K. SUMMARY OF CONTACTS

Considering the small size of the S.P.R.U.C.E. staff, (one full-time director and one secretary, one part-time curator-naturalist, one part-time teacher-naturalist, four part-time resource coordinators) the number of live contacts with pupils and with teachers, separately and together is great indeed. In addition there were many live contacts with administrators and community groups.

Seventy-three "indoor-outdoor" demonstrations were given to 3,481 children. Five hundred and forty children participated in programs designed for junior and senior high school pupils. In addition, one thousand, seven hundred and ten children received planned field trips to sanctuary areas, principally Skidmore. (For details of the figures refer to page 61 in the appendix.)

There were forty-five teacher workshops held with 537 teacher contacts, which in turn affects 14,250 pupils.

One hundred and ninety-five administrative contacts were made and 818 community contacts.

In addition, the considerable number of curricula materials designed to reach teachers and to effect children which were duplicated and disseminated, was formidable. Fifteen thousand, eight hundred and ninety curriculum guides, manuals and brochures were developed. These were sizeable products, ranging up to 42 pages each. There were many single-page aids, also developed for teachers and children. The details on the numbers of "Curriculum Materials" duplicated for dissemination may be found on page 65 in the appendix.

III PHASING OUT OF PROJECT S.P.R.U.C.E.

How effectively the program has been innovated will be reflected in the way it is carried on in the schools after 1969. Different things are happening in each county, depending upon the interest of the Boards of Cooperative Educational Services, individual superintendents, principals, teachers. The greatest promise lies in those areas where the BOCES has undertaken a vital program. It will be most useful to report possible further progress according to each county.

A. ULSTER COUNTY: The innovative camping program from a new point of view was introduced into the Duzine School in New Paltz last year. The school is continuing this program without help this year and it is planned to continue this as an ongoing program. Other schools have requested copies of our camping material which has been developed in order to develop this program.

Several teacher workshops have been held in that county. One meeting was made up principally of supervisors in order to eliminate "points of resistance" in introducing new ideas in teaching. Some were held in individual schools but the majority were conducted at the BOCES headquarters.

BOCES is proposing a budget item for the coming year to hire a teacher-naturalist to carry on the work of Project S.P.R.U.C.E.

Several outdoor areas for school sites have been planned in order to facilitate ongoing "indoor-outdoor" programs.

B. PUTNAM COUNTY: The special interest of a principal of the Garrison Union Free School focused on the development of its school site for "indoor-outdoor" ongoing science-conservation lessons. Interest in this project resulted in the development of the guide,

"Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation". National Wildlife Magazine was impressed by the conservation education program and it is planning a photographic essay on the work of Project S.P.R.U.C.E. in that school in a fall issue.

In addition the S.P.R.U.C.E. camping program has stimulated camping programs in an adjacent area, the Garrison Forest. Several classes will have included camping experiences and will be using "A New Approach to School Camping" for planning the instruction.

C. DUTCHESS COUNTY: The Jay Skidmore Sanctuary which is now owned by Dutchess County Board of Cooperative Educational Services through the efforts of Project S.P.R.U.C.E. has been a center of great activity and community interest. Dutchess County B.O.C.E.S. is definitely planning to carry on the Project S.P.R.U.C.E. program in many ways with personnel and facilities. Greatest interest has been in this county, probably because of the sanctuary as well as the high interest of B.O.C.E.S. personnel. Another factor would be that a great deal of effort was concentrated in Dutchess County this year. An active Advisory Committee for the sanctuary was set up and is carrying on a planning program very enthusiastically. Dutchess County B.O.C.E.S. does plan to have one science-conservation consultant whose work will be concentrated in the curriculum of science-conservation teaching, the use of immediate school sites, "indoor-outdoor" teaching, and is planning sanctuary programs for enrichment purposes. Special Occupational Services are involved in drafting, making blueprints, etc.

One of the important features of this past year in the Dutchess County program was the emphasis on urban instruction. This was tried

with the development of the URBAN DISCOVERY BOX. Dr. Wilhelmina Hill, Coordinator of Environmental Education of the U.S. Office of Education, spent two days exploring and observing the work of Project S.P.R.U.C.E. and was particularly interested in observing a lesson conducted in the city of Poughkeepsie. The topic was Air Pollution. She regarded her experiences as very favorable and wrote a very favorable report.

At Vassar College a series of Demonstration lessons in science-conservation were given to undergraduates who were student teaching in the city of Poughkeepsie. They all used the materials and teaching methods which were demonstrated in their classes. This introduction initiated a point of view which has been initiated by Vassar as part of their teaching program and is to be incorporated in their new MAT program.

Numerous teacher workshops have been held in Poughkeepsie in order to concentrate on the urban scene. The most ambitious one has been a year-long, 15 sessions of workshops. This is the one that has been most carefully evaluated.

D. SULLIVAN COUNTY: Several schools requested that trails be developed on their sites. The "Sight and Sound" program was initiated in this county and has been used quite extensively in schools with community groups such as Boy Scouts through the efforts of one of the science coordinators from B.O.C.E.S.

E. ORANGE COUNTY: Orange County has a sanctuary area known as the "Outdoor Classroom". Although the Garden Club owns the site, the Monroe School System and other interested groups such as the Girl and Boys Scouts may make use of it. Many school visits have taken

place as a result of a series of teacher workshops and the interest of the elementary supervisor. A very rich program using school sites as well as the "Outdoor Classroom" is being planned for this fall.

It is difficult to assess at the present time the extent to which the teachers participating in the workshops will put into practice the principles, techniques, and knowledge acquired in their teaching. However, we have had some immediate indications that are remarkable and commendable. Teachers have already worked with groups of teachers in their home school to prepare them and their students for sanctuary experiences: following this they have served as group leaders for sanctuary trips and have assisted other teachers in their attempts to lead groups in this enrichment experience.

Another workshop participant (from the Myers Corners School) has prepared a proposal that will prepare an outdoor school area for teaching science and science-conservation, to prepare a guide for the teachers, and to aid the teacher in the effective use of the area.

So many teachers have had the wonderful workshop experiences offered by Project S.P.R.U.C.E.; not only are they in a unique position with regard to their own classroom teaching but many other teachers are in a position to learn from these workshop participants.

The responses of a questionnaire sent to elementary and middle school principals, supervising principals, science coordinators and curriculum coordinators are a good barometer of ways in which some of the aims of Project S.P.R.U.C.E. will be incorporated in the future. An analysis of the responses follows:

39% of the respondents indicated a continuation of the environmental science-conservation program coordinated by a specially designated person.

86% of the respondents indicated that they will recommend to their entire faculty the inclusion of environmental education in their courses of study.

92% of the respondents indicate that they definitely plan to use their immediate outdoor school area as a laboratory for learning about the environment.

78% of the respondents indicate that their schools will utilize field trips to other areas for the purpose of enrichment experiences in environmental education.

65% of the Dutchess County respondents indicated that they are including plans to use the Skidmore Sanctuary.

Additional remarks made by these respondents indicate that two schools are trying to work out a cooperative program between B.O.C.E.S. and the Catskill Museum, two schools have indicated that they will conduct their own science-conservation workshops; three schools are in the process of setting up their own nature trails.

The basic principles, philosophies, and methods of teaching conservation education that have been so definitive of Project S.P.R.U.C.E will be applied in a large special project in a New York City school. A proposal "To Plan a Total-Environmental Approach to the Instruction of Emotionally Disturbed Children in Residence in Special (600) Schools" has been prepared by Dr. Esin Kaya and is awaiting funding. This approach will place this "special" child in contact with his environment; Project S.P.R.U.C.E. will now be a significant part of the learning experiences for these youngsters. It should be pointed out that even if funding is not made available for the fall, Dr. Kaya and Dr. Busch will proceed with this innovative project.

It has been indicated earlier in this report that many curriculum materials have been published by Project S.P.R.U.C.E. During the life span of the project, the dissemination of these materials has been extensive and the geographic distribution has been wide. Since there is every indication that these requests will continue, the project is most grateful to Mr. Donald Shannon, Director, Mid-Hudson Regional Supplementary Educational Center. He has indicated that all of the published materials of Project S.P.R.U.C.E. will be registered with ERIC (Educational Research Information Center) and his office will handle the requests for these materials. The wonderful services of Mr. Shannon are a significant part of the phasing out of the project since the continued dissemination of Project S.P.R.U.C.E. materials is assured.

The contributions of Project S.P.R.U.C.E. will not cease with the termination of the project funding. Our report indicates that many provisions have been made at many different levels and localities to assure the continued contributions of this truly innovative project.

IV SUMMARY AND RECOMMENDATIONS

Project S.P.R.U.C.E. was a very ambitious and complex undertaking. One of its most important contributions to the communities it served, as well as the larger community beyond the Mid-Hudson Area, was to bring about a unique awareness of total environment into the existing curricula. This was brought about in a number of ways and was brought to the attention of many teachers and administrators. The number of people served has been vast and this was achieved not only because of the personal contacts and workshops, but by the abundance and unexcelled quality of the products produced as well as their extensive dissemination.

The work of Project S.P.R.U.C.E. has provided teachers for present use and for future use resources and techniques not previously available to them; these will help teachers to carry on with the innovative work initiated by the project.

Since Project S.P.R.U.C.E. was such a complex program, a number of recommendations for future programs might be in order.

Of prime importance would be the recruitment of a more competent staff. Involved are not only the educational background and necessary teaching experience, but salaries, length of service, periods of funding, etc. The staff must be of such calibre as to assist the director to truly function as that position demands and to enable the staff to make its fullest impact. If competent staff is not available, then perhaps a special intensive period should be included to train selected staff for effective participation in such a program.

Secondly, even if we assume that a project has been able to recruit a truly competent staff, the scope of a program should be

much narrower. This would allow for more intensive approaches to the facets being developed.

It would also be more meaningful and no doubt more effective to have a project serve a smaller geographic area. Project S.P.R.U.C.E. served five counties which included a total of approximately 4000 square miles! Travel would definitely be minimized and the schools served would be more closely located and would more closely identify with the project staff. The project could offer fewer schools more intensive services.

The brief funding period of the project has served to be a distinct disadvantage not only in the recruitment of competent staff but also in long range planning of program objectives. Many philosophies of this innovative program are difficult to transmit to teachers and administrators in a brief period of funding. Although there is continued realization of the true contribution of Project S.P.R.U.C.E., a longer period of time would give teachers more opportunity to implement and utilize the new approaches, techniques, and philosophies developed by the Project.

Project S.P.R.U.C.E. focused much of its efforts on teacher workshops and this focus should be continued. However, it would be most advantageous to select teachers who already have competence in science and, therefore, are not participating in the workshop primarily to acquire basic concepts of science. If teachers do not have these competencies, then preceding a workshop which strives to develop new understandings and techniques, an intensive class of a semester or year's duration should be conducted to fulfill this need. We would then be in a much better position to draw conclusions about the impact of the teacher workshops.

The younger participants at Bennett College, Vassar College, and the S.P.R.U.C.E. Workshop differed in their apparent reaction to adopting new phases of the program. These individuals were more flexible and were not established in their teaching methods. They readily applied the new approaches almost immediately. Perhaps it would be better to focus on selecting the younger, less experienced teachers for workshop participation and special consideration might be given to conducting pre-service workshops.

The teacher workshops should be limited to teachers from a smaller geographic area in order to facilitate meetings. There is perhaps also a need to schedule the workshop hours earlier in the day so that, particularly during the winter season, more daylight would be available for using outdoor resources and possibly more meetings should be considered. The most recent workshop participants were teaching in grades K-8. Workshops organized for teachers of one or two grades would allow greater opportunities for concentration on special areas of the science curriculum.

The evaluation of the workshop participants should continue and include the observation of teachers by a trained observer in the classrooms before, during, and after their participation in the training program. However, it would be most helpful if the observed lessons could focus on a particular topic area which could incorporate that which has been learned. It might also be very valuable to observe selected teachers teaching an entire science unit rather than individual lessons since an individual lesson does not always fully portray the true impact of a program.

The exposure of teachers to new techniques and approaches should bring about changes in their teaching. A study should be made which would evaluate the effect of the special training upon the children - to what extent have they developed attitudes and values regarding the condition of the planet, the extent to which they become imbued with a sense of responsibility, and furthermore, what conservation activities result from such teaching.

In reviewing all of the work of Project S.P.R.U.C.E., there is evidence from many sources to support the idea that this project has made a truly favorable impact and has been a successful project!

APPENDIX

Dr. Busch
Bennett College Workshop
13 Pupils
December 6, 1968

0:10

Dr. B: Please write a lesson as you would teach it. You can write it so that it will be useful to you. The lesson will be different for each person. Here is a card. Write your name on the card. Now you have a problem. Write your name on the problem. Remember your problem.

In developing the problem, what will you consider? How would you go about it? Would someone like to discuss a problem? Would someone like to discuss their problem?

S: Number 12. Which part of the playground is warmer?

Dr. B: How would you prepare for it?

S: I'll ask them in the morning. Dr. B: We are going out on the playground and we will touch things to see which is warmest. What could you do beforehand?

S: I don't think you need to do a playground preparation...I think they could touch things indoors.

Dr. B: You have a teaching problem. (1:20) How do you solve it? Let's take two jars of water and test them. What assumption are you making? S: That the water is the same.

T: Also check your assumption. You are assuming that Children know the difference between hot and cold. Touch the floor - in the sun and in the shade. Which is warmer? You see children must make a series of assumptions. Suppose you do 2-3 days preparation deciding between hot and cold. Until you need to use an instrument or thermometer to measure, you build concepts. You are concerned with careful observation. What makes this warmer or cooler? They are trying to make an explanation.

C: Different responses. Dr. B: Suppose a child says "in the sun", then what happens when there is no sun? (1:25) "Let's all feel in the sun. Let's all touch in the shade. If I take the sun away will it be cool? Make a shadow.

S: Suppose a child doesn't understand a shadow?

Dr. B: What kind of shadow do you get from a hand? A pencil, etc.? If they are interested bring in foil, glass, seran wrap, waxed paper. Will waxed paper make a shadow? So the children are making assumptions.

S: If there is no sun, what do you do?

Dr. B: You don't do shadows. What can you do? You can do creative teaching.

S: Use a flashlight. Dr. B: A jar of hot water and a jar of cold water.

S: That doesn't help on the playground.

Dr. B: Yes, it does because you are showing a concept of hot and cold. If you were to touch soil, grass, wooden bench, iron of swings, which would be the warmest?

S: Different replies.

Dr. B: Could you both be right? Probably you will all agree which is warmest outside - lie down in the sun - see if there is a difference.

S: Just a moment - you wanted to show cold, warm, hot.

Dr. B: Yes, you are building concepts. Concepts change and enlarge in concept formation. C: Animal evidence. Can you take a spider?

Dr. B: Is a spider an animal? S: No, an insect.

Dr. B: Is an insect an animal? There are three divisions - minerals, animals, plants. Is a spider an animal? S: Yes.

Dr. B: It is important to verify things, to test things.

S: Is a three year old able to handle a string around a tree?

Dr. B: Probably not - it might take two children. It is good to project the situation. S: Number 14.

:35

Dr. B: Make things interesting to yourself, then it will be interesting to the children, then bring in a little conservation. Let us plug up all the holes where chipmunks live. Even at a young age, you can teach them something about interrelationship. The idea is for them to find out. What keeps the animals warm? What do you do to keep warm. There is no way unless you lecture on climatology - you can start - when springtime comes, what does your mother find on the furniture? Yes, animals shed their winter coats.

Dr. Busch explains assignment.

:40

Dr. B: The problem I had to present to you today is about habitat. What does it mean to you?

S: Home.

Dr. B: An animal feels at home only in its habitat. What makes life possible? S: The environment about it.

Dr. B: What about the environment? S: Food, water.

Dr. B: Protection - a place to have its babies or you would have the nd of a species. What kinds of habitats do you have in this room?

S: Gerbil...plant...fish in water.

1:45

Dr. Busch: How about cockroaches?

S: How about spiders?

Dr. B: See the spider egg cases on this cardboard box.

S: Flies. Dr. B: You left out an important animal. S: Us. Dr. B: Yes, people. Let us go outside now to find habitats. Group I look only underfoot. Group II look only at eye level. Group III look only overhead. Look for evidence. What kind might there be? Suppose I see a nest? Suppose I see a snake, bird? Is that direct or indirect evidence? That is another large concept. Let's go and investigate habitat in Bennett.

1:55

Dr. B: What did you find on the ground? S: Grass. Dr. B: What else? We did not give this enough time. I found a hornet's nest. After a good freeze you can safely remove it. What I am going to do is give each one a piece so that you can add it to your collection. You can use a magnifying glass to investigate a habitat. So you can investigate further. You can use other flies, hornets nest, etc. and do a unit on it. These wasps chew twigs and make paper for their nests. There is a good book on insects. There are some good examples of insect habitats. Another good book Who Lives There by Colby.

Dr. Busch holds up cards with pictures on them and says "Who lives there?" You have fields, trees, stream, etc., so that a child can find all types of habitats.

Students examine cards. (2:03) Dr. B: Ranger Rick has a good article. Use rhymes, riddles, etc. - another resource. I brought you a present. Mini-boxes - we made them up for you. Another resource is filmstrips. This is a film strip for cities. One thing that is important. You must use a manual. Each is divided into thirds. This is just a suggestion for the use of filmstrips. All of this is underfoot. Excavations all have a wall around them.

2:08

Motivation - this is an opening for a field trip. Conservation is many things. It is changing land for people to use.

Dr. Busch shows a short filmstrip. (2:15) If you are going to use a filmstrip, there is a lot of preparation before and after.

PERSONAL INTERVIEW OF MISS ROSEMARY GANNON, BENNETT COLLEGE, WHOSE STUDENTS RECEIVED A SERIES OF SIX TEACHING SESSIONS FROM DR. BUSCH FOR PROJECT S.P.R.U.C.E. IN THE FALL SEMESTER '68-69. INTERVIEW WAS CARRIED OUT BY MRS. CLARE MAY ASSISTING DR. KARLE IN THE EVALUATION OF THE PROJECT. DATE OF INTERVIEW FEBRUARY 13, 1969.

Miss Gannon felt that major results were obvious from the workshop primarily in the approach of the students. The teacher indicated that the students were "passing out less glib information" and were instead asking questions and attempting to have the children "discover". Of major benefit was the making of mini-boxes by the students for rainy and sunny days. They, by themselves, were forced to "go out and find" articles for their boxes. Then they made up lesson plans for different age levels - 3 years, 4 years, Kindergarten, 1st and 2nd grade. This represented a different type of project for them.

Miss Gannon noted that the teachers with now greater awareness would direct conversation of the children on walks toward what they could see, rather than in general conversation.

Conservation concepts came in primarily in terms of "saving" - water, trees, etc.

Faculty members were made aware of their own lack of emphasis on science concepts and conservation concepts in teaching students. Although large blocks are devoted to children's literature, art, etc., no block is devoted to science. Faculty members were surprised to see three year olds and four year olds mastering concepts of science in the workshop conducted by Dr. Busch. The reading list and sources made available by Dr. Busch should be incorporated into the theory and required reading of their students.

Miss Gannon was most enthusiastic over the method of the program with its evidence of questioning and discovery. Discovery boxes used in different seasons are a major contribution. The unique skill and personality that Dr. Busch brings to the program contributes to the impact of it.

Miss Gannon was most enthusiastic in her praise of the project. She discussed for an hour the matters summarized in the previous paragraphs.

Millbrook BENNETT COLLEGE New York

February 24, 1969

Mrs. Morris May
63 Park Avenue
Poughkeepsie, New York 12603

Dear Mrs. May:

The enclosed material I believe completes the assignment given by Dr. Busch to the Child Study Seniors.

In response to the questions sent to me, as I discussed with you on February 13, three of the students during the first semester had an opportunity to make use of the material presented. They used it in projects presented in Four Year Old groups. These projects were related to melting snow and discussing the dirt that they saw in the water. Using the question and answer method that Dr. Busch demonstrated so well they tried to develop the concept that snow should not be eaten. Another student with the children planted a hyacinth bulb and the children cared for it and were delighted when it blossomed. This semester several students are planning to use their mini-boxes as they work out projects not only with the Nursery School children, but also with Kindergarten and First Grade groups where they work. Last week a student presented the melting snow project at the Dover Day Care Center and the director reported that she did a fine piece of work.

The faculty are constantly utilizing the workshops as they work with both children and students. They have asked students to plan more science projects for this semester and they also are using the ideas and materials that Dr. Busch gave to us.

The demonstration in both Four Year Old groups was extremely valuable. Teachers and students observed Dr. Busch putting theory into practice. During conferences in January with Four Year Old parents, a number of them asked about this "special day" since the children had talked about it and brought home some leaves and pieces of branches that she had given to them.

Her classes with the students were excellent. She gave them materials and ideas which they are using and I am sure they will continue to use them. The mini=boxes which each one prepared I checked and these, although they took time to prepare, especially the lesson plan, were most valuable since they were evidence of what the students gained from Dr. Busch's presentation. They also will be of use in the future.

As I told you our recommendation is that Dr. Busch come every year! Of course we understand that this program is or was funded by the government, but we do believe that it is one from which every potential as well as present teacher could gain many skills so necessary in working with young children.

You will also be interested to know that two of the Nursery School teachers asked me last week to order the books and magazines that Dr. Busch recommended so that we can have the necessary reference materials. I assured them that I shall make every effort to include these materials in the budget.

In conclusion I must say that Dr. Busch's enthusiasm, skillful techniques in presenting ideas and the interest that she aroused in the students and teachers contributed immeasurably to our work during the first semester. We are most fortunate in having had such workshops.

Sincerely,

Rosemary Gannon, Chairman
Child Study Department

enclosure

PERSONAL INTERVIEW OF DR. JOSEPHINE PALMER, VASSAR COLLEGE, WHOSE STUDENTS RECEIVED A SERIES OF TEACHING SESSIONS FROM DR. BUSCH FOR PROJECT S.P.R.U.C.E. IN THE FALL SEMESTER '68-69. INTERVIEW WAS CARRIED OUT BY MRS. CLAIRE MAY ASSISTING DR. KARLE IN THE EVALUATION OF THE PROJECT. DATE OF INTERVIEW FEBRUARY 13, 1969.

Dr. Palmer voiced great enthusiasm for Dr. Busch's course with the Vassar students. Dr. Palmer was quickly able to see the incorporating of method and of content within the student teaching sessions. She is anticipating even greater use during the present term. Although students utilized the material differently, each one felt more confident in approaching science in the classroom. This is an area which is almost untouched normally in the preparation of Vassar students for teaching. No course emphasizes science subject matter or method as developed by Dr. Busch, Project S.P.R.U.C.E. which was a unique bonus to this group. Several of the students used the out-of-doors approach with their classes.

Of enormous value was the attitude that science can be taught within the immediate environment. This represents a sharp contrast to the usual emphasis on extensive and expensive science laboratories. The value of the mini-boxes contributed to this realization. The boxes reflect among other things, the availability of "natural material" for teaching. Here again the students responded quickly with understanding and appreciation for "collecting" e.g. leaves.

Dr. Palmer felt that the impact of the method - "discovery" - carried over into the students teaching in subjects besides science. The girls on many occasions attempted to "develop and pull" from the class. This marked a difference from their previous methods.

Dr. Palmer indicated that to her mind S.P.R.U.C.E. and Dr. Busch are a unity. Dr. Busch's wide knowledge and unique ability to utilize the "discovery" method has enormous impact upon both the students and faculty.

Dr. Palmer was less than confident future students in her classes would have the benefit of an expert in conservation education. She indicated that finances are very restricted.

Dr. Palmer felt that colleges devoted specifically to teacher preparation should incorporate both the method and content of Project S.P.R.U.C.E.

PRODUCTS BY PROJECT S.P.R.U.C.E.
July 1, 1966-June 30, 1969

I Curricula Materials: Manuals to Implement the Teaching of Environmental Education

1. "A New Approach to School Camping Grades K-6: Some Suggestions for Outdoor Investigations in Science-Conservation for Camps, Playgrounds, Parks, Sanctuaries" by Project S.P.R.U.C.E. staff. 1969.

2. "Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation" (based on Garrison Union Free School in Putnam County in a rural area.) 1968.

3. "Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation" by Dr. Phyllis S. Busch, Project Director. (Revised to apply to urban as well as rural areas). 1969.

4. "Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation" Reprinted in series. "Nature Study Tips" in Nature Study, Winter 1968-69.

5. "PINE - a Teaching Guide to Discovery Indoors & Outdoors: 101 Stimulating Ideas Grades K-6" by Dr. Phyllis S. Busch, Project Director. (Designed to accompany a box of specimen). 1967.

6. "S.P.R.U.C.E. Discovery Manual 169 Investigations Indoors & Outdoors, Grades K-6" by Dr. Phyllis S. Busch (Designed to accompany a box of specimen). 1969.

7. "S.P.R.U.C.E. Urban Discovery Manual: 75 Stimulating Ideas for Investigating Some Common Urban Resources K-6" by Dr. Phyllis S. Busch, Project Director. (Designed to accompany a box of specimen). 1969.

8. "Some Guides to Discovery About Cement, Cockroaches, Earthworms, Elm Trees, Owls" by Dr. Phyllis S. Busch, Project Director. 1968.

9. "Some Problems for the Teacher Useful as a Basis for Planning Lessons in Science-Conservation" by Dr. Phyllis S. Busch, Project Director. 1969.

10. "Teaching Tips on Current Environmental Problems" by staff of Project S.P.R.U.C.E. 1969.

11. "Spruce: A Curriculum Presentation" by Dr. Phyllis S. Busch. 1967.

II Newsletters

1. Open Space - December 1967
2. Air Pollution - January 1968
3. Water Pollution - September 1968
4. Noise Pollution - October 1968
5. Space & Population - December 1968
6. Snow - January 1969
7. Field Trips (in our five county area) April 1968
   Brochure 1966-67
   Brochure 1967-68
   Brochure 1968-69

III Bibliographies

1. "Some Reference Material on Snow"
2. "Books, Publications, & Records on Noise Pollution and Noise"
3. "Books, Publications & Films on Air Pollution"
4. Modification of "Conservation Education: A Selected Bibliography" by Joan Carvajal and Martha Munzer

IV Discovery Guides & Data Sheets

1. "Paved Deserts" and Rocks
   Outdoor Discovery Guides on
2. Tree Growth
3. Number of seeds
4. Area Sampling Data
5. Amount of Soil
6. Weather Observation
7. Data Sheet for Problem: What material would make the warmest coat in today's weather?
8. Temperature Data Card
9. Horse Chestnut Twig
10. Discovery Guide on Habitats
11. Elm Tree Investigations
12. Cement & Concrete Investigations
13. Investigations: Earthworms
14. Investigations: Cockroaches
15. Investigations: Elm Trees
16. Discovery Guide on Rate of Tree Growth
17. Size of Raindrops

V Sanctuary Aids

1. Discovery Guide for Sanctuary - Habitats
2. Sanctuary Discovery Guide - Habitats
3. Letter following a Field Trip
4. Fields & Woodlands, A Review and Follow-up with Conservation Implications (K-1-2)
5. Fields & Woodlands, A Review and Follow-up with Conservation Implications (3-4)
6. Fields & Woodlands, a Review and Follow-up with Conservation Implications (5-6)
7. Weather and Life, A review and Follow-up with Conservation Implications (K-3)
8. Weather and Life, a Review and Follow-up with Conservation Implications (4-6)

9. Ponds and Wetlands, A Review and Follow-up with Conservation Implications (K-3)
10. Ponds and Wetlands, A Review and Follow-up with Conservation Implications (4-6)
11. Jay Skidmore Sanctuary - How to Get There
12. Map of Skidmore Sanctuary
13. Cover Map of Skidmore Sanctuary

VI Reports of Resource Surveys of School Sites

1. Mt. Marion School, Mt. Marion, N.Y.
2. Oak Grove School, Poughkeepsie, N.Y.
3. Staatsburg Elm. School, Staatsburg, N.Y.
4. Frank L. Meagher Elm. School, Kingston, N.Y.
5. Kinry Road School, Wappingers Falls, N.Y.
6. Vassar Road School, Poughkeepsie, N.Y.
7. North Park Elm. School, Hyde Park, N.Y.
8. Randolph School, Wappingers Falls, N.Y.
9. Myers Corners School, Wappingers Falls, N.Y.
10. Liberty Street School, Middletown, N.Y.
11. Monroe-Woodbury High School, Central Valley, N.Y.
12. Outdoor Classroom, Schunnemunk Road, Monroe, N.Y.
13. Monticello Elementary School Survey
14. Garrison Union Free School Forest Trail, Garrison, N.Y.

VII Techniques for Teaching

1. Outline for a Teaching Unit
2. Winter School Site Problems - Kindergarten-Nursery level
3. Spruce Discovery Corner: How to Assemble
4. Some Suggested Problems for Investigations Indoors & Outdoors
5. Terraria
6. How to Catch Snow Crystals
7. Self-Guiding Indoor Trail: Practice in Its Development and Use

IV Discovery Boxes

1. P.I.N.E. Discovery Box 1967
2. S.P.R.U.C.E. Discovery Box 1968
3. Urban Discovery Box 1969

X S.P.R.U.C.E. Discovery Corner

XI Visuals

1. Slides of assorted project activities
2. 16mm film of some urban outdoor teaching activities (on loan to Andrew Johnson, Missouri Botanical Garden, 2315 Tower Grove Avenue, St. Louis, Missouri 63110.)
3. Sight & Sound Slides and Tape: McAndrews & Copening

XII Evaluations 1967, 1968, 1969

XIII S.P.R.U.C.E. Proposals 1967-68, 1968-69

SCHOOL GROUPS VISITING SKIDMORE SANCTUARY — FALL 1968

Oct. 10	Fishkill 5th grade (Wappingers School District)
Oct. 11	Fishkill 5th grade (Wappingers School District)
Oct. 14	Fishkill 5th grade (Wappingers School District)
Oct. 17	Fishkill 5th grade (Wappingers School District)
Oct. 22	BOCES Community School (Mr. Brown)
Oct. 23	Fishkill Plains Kindergarten, Miss Ketcham (Wappingers School District)
Oct. 24	Fishkill Plains Kindergarten (Wappingers School District)
Oct. 25	Cub Scout group
Oct. 30	Titusville 4th grade, Mrs. Burke (Arlington School District)
Oct. 31	Overlook, Mrs. Lane (Arlington School District)
Nov. 1	Myers Corners, 3rd grade, (Wappingers District) " " " " " " " " " " " " Teachers: Mrs. Doughty, Mrs. Beauchamp, Mrs. Stratton
Nov. 6	LaGrange, morning Kindergarten " afternoon "

SKIDMORE SANCTUARY FIELD TRIPS — SPRING 1969

LaGrangeville (Arlington School District)		4th grade	April 17
Vassar Road School, Miss Mierzwa (Wappingers School District)		5th grade	April 17
Myers Corners School, Mrs. Carver (Wappingers School District)		3rd grade	April 21
LaGrange School, Mrs. Romano (Arlington School District)	A.M. P.M.	Kindergarten	April 29 May 1
La Grange School, Mrs. Masson (Arlington School District)		2nd grade	May 5
Vassar Road School, Mrs. King (Wappingers School District)		3rd grade	May 5
LaGrange School, Mrs. Michaels (Arlington School District)		3rd grade	May 6
Vassar Road School (Wappingers School District)		3rd grade	May 6
Vassar Road School, Mrs. Otis (Wappingers School District)		3rd grade	May 7
Myers Corners School, Mrs. Kowalski (Wappingers School District)		2nd grade	May 7
Sheafe Road School, Mr. Hart (Wappingers School District)		6th grade	May 8
Vassar Road School, Mrs. Lambert (Wappingers School District)		4th grade	May 9
Vassar Road School, Mrs. Fleishman (Wappingers School District)		1st grade	May 12
Sheafe Road School (Wappingers School District)		3rd grade	May 12
Millbrook Elm. School, Mrs. Hammond (Millbrook School District)		3rd grade	May 13
Vassar Road School, Mrs. Lawson (Wappingers School District)		1st grade	May 13
Vassar Road School (Wappingers School District)		4th grade	May 13
LaGrange School, Mrs. Parker (Arlington School District)		Kindergarten	May 14

(Field Trips continued)

Vassar Road School, Miss Pearce, Miss Rappylea (Wappingers School District)		2nd grade	May 14
LaGrange School, Mrs. Parker (Arlington School District)	P.M.	Kindergarten	May 14
Vassar Road School, Mrs. Schmalkueke (Wappingers School District)		1st grade	May 15
Myers Corners School, Miss Ramage (Wappingers School District)		2nd grade	May 15
Vassar Road School, Mrs. Booth (Wappingers School District)		4th grade	May 16
Sheafe Road School, Mrs. Pelton (Wappingers School District)		2nd grade	May 16
Millbrook Elm. School, Mrs. Bullis (Millbrook School District)		3rd grade	May 16

PEARL RIVER PUBLIC SCHOOLS
EVANS PARK ELEMENTARY SCHOOL

40 Marion Place
Pearl River, New York 10965
Phone: 914 PE 5-4091

Robert F. Alioto
Superintendent

Richard A. Anderson
Principal

May 6, 1969

Dr. Phyllis S. Busch
Project Director
S.P.R.U.C.E
Pine Plains, N.Y. 12567

Dear Dr. Busch:

Thank you for the following guides which we found most interesting:

1. URBAN DISCOVERY MANUAL: 75 STIMULATING IDEAS FOR INVESTIGATING SOME COMMON URBAN RESOURCES

2. SOME GUIDES TO DISCOVERY ABOUT ELM TREES, OWLS, COCKROACHES, EARTHWORMS, CEMENT AND CONCRETE GRADES K-6

If available, we would greatly appreciate 15 additional copies of each guide.

Sincerely,

Richard A. Anderson
Principal

CHESTER ELEMENTARY SCHOOL
Maple Avenue
Chester, New York 10918
Area Code 914-469-2150

ROGER A. GOLDEN
Supervising Principal

PATRICIA A. HERBERT
Elementary Principal

Dr. Phyllis S. Busch
Project S.P.R.U.C.E.
Pine Plains, New York 12567

May 6, 1969

Dear Dr. Busch:

Thank you for the two excellent guides you recently sent to my attention. I would like to request four copies of each guide for sharing with our classroom teachers.

Thank you for your cooperation.

Sincerely yours,

Patricia A. Herbert,
Elementary Principal

PAH:nw

SUMMARY OF CONTACTS

LIVE CONTACTS (Pupils, Teachers, Administrators, Community Groups)

(July 1, 1968 - June 30, 1969)

Elementary Classroom Demonstrations		Pupils
Bennett (PSB)*	1 x 30	30
Sprout Lake Camp (JG)	2 x 25	50
Girl Scout Day Camp (JG)		65
Audubon Field Trips (PSB)	4 x 24	96
Elementary Schools (RC)	106 x 30	3180
Elementary Schools (KW)	3 x 20	60
		3481
Junior & Senior High		
Sight & Sound Program (RC)	16 x 30	480
Hyde Park (PSB)		60
		540

*Initials in parenthesis indicates staff member

TEACHER WORKSHOPS	TEACHERS	PUPILS
NSTA (PSB)	40	1200
Hyde Park (PSB) 3x	58	1740
Poughkeepsie (PSB) 15x	33	390
Orange County (PSB & SB) 4x	35	1050
Orange County (including Seven Steps) (SB)	65	1950
Putnam County (KW & RC)	15	450
Rondout (KW) 2x	10	300
Audubon (PSB)	20	600
Bennett (PSB) 6x	21	630
Vassar (PSB) 6x	7	210
Westchester (PSB)	30	900
Garrison (PSB) 2x	2	60
Webutuck (RC) 8x	14	420
Orange County (PSB & SB)	30	900
Vassar-Psych. Ed. (PSB)	30	900
Sullivan County (PSB)	7	210
Skidmore Teacher Training (PSB & JG) (RC)	6	
Camp Wakoda Staff Training (SB)	25	750
Skidmore Training (PSB)	2	
Scout Counselors (Dutchess County) (JG)	10	300
Scout Leadership Trainees (Orange Co.) (SB)	33	990
Outdoor Classroom (SB)	30	300
Liberty Workshop & Survey (SB)	14	
	537	14,250

COMMUNITY CONTACTS

Audubon Festival (PSB & JG)	500
Methodist Church, LaGrangeville (PSB & JG)	40
Forest Practice Board (JG)	7
Pine Plains Garden Club (JG)	15
Dutchess Co. Planning Board (PSB)	3
Orange-Dutchess Garden Club	2
Skidmore Family Trips (HM)	75
OEO (8x) (George Morris)	36
Adult Ed. Course at Monroe-Woodbury (SB) 10x	120
PTA, Central Valley (SB)	20
	818

ADMINISTRATIVE CONTACTS

Science Coordinators Meeting (PSB)	18
Urban Principals-Ulster (PSB)	20
Wappingers Principals Meeting (PSB)	25
Orange County Supervisors (PSB)	3
Vassar Ed. Dept. (PSB)	5
Amenia Supervisor (PSB & RC)	3
Pine Plains Central School Sup. (PSB & RC)	5
WGBH Urban Meeting, Boston (PSB)	35
Vassar (Dean, Ford Foun. etc.) (PSB)	5
Dutchess Co. BOCES (PSB & JG)	8
" " " " "	3
Shannon (PSB)	1
Greer School (PSB)	5

Administrative Contacts (continued)

Cardinal Hayes School (PSB)	5
Shannon (PSB & JG)	1
Dr. Rillo, Glassboro, N.J. (PSB)	5
Weiner, Illinois (PSB)	1
Albany (Rosenstein, Amyot, Johnstone, Templeton) (PSB & SB)	4
Skidmore Advisory Board (PSB, JG & RC)	15
Luncheon meeting	8
Dr. Hunger (PSB)	1
Rondout (KW)	2
Shimoda (RC)	1
Orton (RC) & O'Connor	2
Millbrook Principal & Faculty (PSB)	4
Seven Step Contacts (RC)	10
	195

SANCTUARY TRIPS

Skidmore	18	540
Manson	15	450
Strauss, W.	2	60
Strauss, T.	1	30
Widmer, K.	2	60
Copening, R.	11	330
Busch, P.	1	30
Barker, S.	7	210
	57 classes	1,710 pupils

TOTAL PUPILS AFFECTED BY CLASSROOM DEMONSTRATIONS, FIELD TRIPS, TEACHER WORKSHOPS:

3,481	Elementary demonstrations
540	Jr. & Sr. High School
14,250	Teacher workshops
1,710	Sanctuary trips
19,981	TOTAL

CURRICULUM MATERIALS DUPLICATED FOR DISSEMINATION

(July 1, 1968 - June 30, 1969)

SEVEN STEPS FOR DEVELOPING A SCHOOL AREA FOR TEACHING SCIENCE-CONSERVATION	1200
A NEW APPROACH TO SCHOOL CAMPING	750
TEACHING TIPS	400
GUIDES TO DISCOVERY	800
URBAN DISCOVERY GUIDE	900
URBAN DISCOVERY BOXES	40
NEWSLETTERS, #'s 3, 4, 5, 6, 7	7200
PROBLEMS FOR TEACHERS	100
INDIVIDUAL DISCOVERY GUIDES	4500
TOTAL	15,890